

PATENT COOPERATION TREATY

PCT

REC'D 19 JUL 2000
19/07/00
PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 65797	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US99/08844	International filing date (day/month/year) 22/04/1999	Priority date (day/month/year) 30/04/1998

International Patent Classification (IPC) or national classification and IPC
E21F17/18

Applicant
THE GOVERNMENT OF THE UNITED STATES OF AMERICA

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I Basis of the report
- II Priority
- III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV Lack of unity of invention
- V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI Certain documents cited
- VII Certain defects in the international application
- VIII Certain observations on the international application

Date of submission of the demand 23/11/1999	Date of completion of this report 17.07.2000
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Mosedale, T Telephone No. +49 89 2399 2286



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/08844

I. Basis of the report

1. This report has been drawn on the basis of (substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.):

Description, pages:

1-13 as originally filed

Claims, No.:

1-21 as originally filed

Drawings, sheets:

1/7-7/7 as originally filed

2. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

3. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c));

4. Additional observations, if necessary:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US99/08844

V. Reasoned statement under Article 35(2) with regard to novelty, inventiveness step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1-21
	No: Claims
Inventive step (IS)	Yes: Claims 1+9+10
	No: Claims 1-8,11-21
Industrial applicability (IA)	Yes: Claims 1-21
	No: Claims

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Section V:

1) In the terms of claim 1 US-A-4 581 712 (cited on page 1 of the description) discloses:

an apparatus for monitoring the dynamic loading rate (col.2, I.43-67) on support systems used in an underground mine to withstand abutment pressure (col.1, I.6-13), comprising:

- a **plurality of** load sensing devices 18, **each** adapted to be coupled to one of the support systems 14 (fig.2) used in the underground mine 10;
- a programmable controller 22 for processing support system loading information received from said plurality of load sensing devices (col.5, I.39-59); and
- a sensory indicator 24 controlled by said programmable controller to provide timely warning indications **usable on a real-time basis** (col.4, I.11-17) as an aid in determining when to install additional support systems (col.3, I.46-50) and **to alert** miners of dangerous loading conditions on the support systems during mining operations (col.3, I.51-57).

Thus the subject-matter of claim 1 differs from that known from US-A-4 581 712 by comprising not only one, but a plurality of sensory indicators.

Claim 1 thus formally satisfies the requirement of novelty defined in Article 33(2) PCT, since its subject-matter differs, not only from that of US-A-4 581 712, but also from that of all the remaining available prior art documents.

2) In the above evaluation the prior art printer 24 has been equated to one single "sensory indicator", ie. to a readable printed record (to be sensed optically), even though at the moment of printing the printer necessarily also provides an accompanying acoustic indication, sufficient to warn any operator present of the change in loading currently being listed. Whereas neither the readable printed record itself, nor even the noise accompanying the printing process, would correspond to "a sensory **warning**", they are certainly sufficient to count in the terms of claim 1 as at least one "sensory indicator" capable, when consulted, of providing timely warning.

US-A-4 581 712 makes quite clear that the roof pressure monitoring system disclosed is designed to serve as a warning alarm (cf. col.1, l.16-23; col.1,l.65 - col.2,l.2; col.3, l.46-56; col.5,l.60 - col.6,l.7; col.6, l.31-32); in circumstances where the printer-based information might provide insufficient warning, the operator addresses the problem of enhancing the warning function of the known monitoring system.

In this context he is necessarily aware of US-A-3 949 353, where an underground mine surveillance system monitors seismic information and, whenever an unusual event occurs, triggers in real time (col.4, l.35) a printer 72, 84 (col.5, l.25-27), together with an alarm 68 and a visual display 70, 82, 100 (col.4, l.10-13; col.5, l.15-24; col.6, l.56-68).

Thus US-A-3 949 353 teaches that attention can be drawn to real-time events needing human intervention by supplementing the printed log by alarm and visual display means. It thus becomes obvious to include such facilities as may prove necessary under the given circumstances so as to draw extra attention to the printed log of excessive dynamic loading rate foreseen in US-A-4 581 712.

Thus the subject-matter of claim 1 fails to evidence the inventive step required over US-A-4 581 712 under Article 33(3) PCT.

- 2) The preceding considerations apply mutatis mutandis to the independent apparatus claims 12 and 21 and also to method claim 15.

US-A-4 581 712 also discloses all features of dependent claims 2 and 3 (col.2, l.41), and 4 - 8. The feature of dependent claim 11 is readily available from US-A-4 426 642 (ref. 36).

However whereas the feature of dependent claim 9 combined on its own with claim 1 would appear to be obvious in the light of US-A-3 949 353, when starting from US-A-4 581 712, there is no immediate lead to the combined subject-matter of claims 1, 9 and 10, provided that in addition all the constituent features be situated materially proximate to each other, and thus in use also proximate to the respective support system as dedicated monitoring apparatus (cf. current claim 6

and page 3, lines 1 - 14). A claim amended accordingly, so as to include all such features, should prove suited to substantiating the inventive step required under Article 33(3) PCT. Claims 2 - 8 and 11 might then remain as claims appendant to a main claim resulting from such a combination of claims 1, 9 and 10 (Rule 6.4 PCT).

- 3) It is noted that the further apparatus claims 12 and 21 are effectively identical in substance to claim 1 and that preceding objections apply to these claims mutatis mutandis; dependent claim 13 corresponds substantially to preceding claim 7 and claim 14 to the combination of preceding dependant claims 10 and 11. In the present case it is therefore considered sufficient, in the light of PCT Guidelines III, 5.1, for there to be only two independent claims, namely a main apparatus claim and an accompanying method claim.

Whilst method claim 15 suffers mutatis mutandis from the same lack of inventive step as that established in sections 1 and 2 above for apparatus claim 1, the steps of dependant method claims 16 and 17 are likewise known from the closest prior art of US-A-4 581 712 and the considerations established for claim 9 apply mutatis mutandis to claim 18. The feature of method step 19 appears to be obvious in the light of US-A-4 426 642, whilst no particular technical effect can be associated with the welding step of claim 20, where this apparently serves as no more than one of a number of otherwise equivalent mounting techniques.

Section VII:

The reference signs required by Rule 6.2 (b) PCT should be included throughout at least all the apparatus claims. The independent apparatus claim should further, in accordance with Rule 6.3 (b) PCT, be drafted in two-part form relative to the closest available prior art according to US-A-4 581 712. The introductory reference to this prior art should be corrected so as not to suggest that the processing and analysis according to that prior art were not performed in real-time or would not detect dynamic changes in the loading rate.

The introductory portion should also include a consistency clause according to Rule 5.1 (a)(iii) PCT corresponding formally to each independent claim.

It should presumably read "yellow" instead of "red" in line 27 of page 12.

As regards the final paragraph on page 13 in the light of PCT Guidelines III, 4.3a lines 23 - 25 should read "... skilled in the art **within** the scope of the present invention **as defined by** the appended claims". The final sentence should only refer to the apparatus (device), since the method is claimed in terms specific to use "in an underground mine to withstand abutment pressure" and is thus restricted to such use.

Section VIII:

- 1) The term "dynamic loading rate" employed in the claims fails to define per se the type of monitoring and processing to be performed by the apparatus since, although evocative, "dynamic" fails to indicate specifically in exactly what respect the loading rate concerned is supposed to be dynamic. In order for their definition to be self contained the claims should therefore use the full expression employed on page 3 (lines 22,23), namely "dynamic changing in the loading rate".
- 2) When referring to "is mounted" dependent claim 5 has the form of a method feature by means of which the designation is implicitly change from "monitoring apparatus" to an "underground mine support system comprising monitoring apparatus". This potentially introduces a lack of clarity.

The expression used in claim 6 "an embedded microprocessor having based system" is obscure; should this rather refer to a "dedicated" processor, as mentioned on page 5 (line 14) ? It is also noted, for good measure, that in claim 12 the expression "means for installing at least one load sensing device" is such as not to include the substance of the load sensing device itself.

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 65797	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 99/ 08844	International filing date (day/month/year) 22/04/1999	(Earliest) Priority Date (day/month/year) 30/04/1998
Applicant		

THE GOVERNMENT OF THE UNITED STATES OF AMERICA

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
 - contained in the international application in written form.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority in written form.
 - furnished subsequently to this Authority in computer readable form.
 - the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
 - the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. **Certain claims were found unsearchable** (See Box I).

3. **Unity of invention is lacking** (see Box II).

4. With regard to the title,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the abstract,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

as suggested by the applicant.

because the applicant failed to suggest a figure.

because this figure better characterizes the invention.

1

None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 99/08844A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 E21F17/18 E21D15/46

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 E21F E21D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 426 642 A (POFFENBARGER PERRY S) 17 January 1984 (1984-01-17) abstract; figures ---	1, 12, 15, 21
A	US 4 913 499 A (SMART BRIAN G D) 3 April 1990 (1990-04-03) abstract; figures ---	1, 12, 15, 21
A	US 5 668 325 A (CHEN JINSHENG S ET AL) 16 September 1997 (1997-09-16) the whole document ---	1, 12, 15, 21
A	US 4 156 236 A (CONKLE ELLSWORTH V) 22 May 1979 (1979-05-22) ---	1, 9, 14, 18
A	FR 716 766 A (E. WEXLER) 24 December 1931 (1931-12-24) ---	
		-/-

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier document but published on or after the international filing date
 "L" document which may throw doubts on priority, claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
 "&" document member of the same patent family

Date of the actual completion of the international search 6 July 1999	Date of mailing of the international search report 13/07/1999
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Fonseca Fernandez, H

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/08844

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 594 773 A (CONKLE ELLSWORTH V ET AL) 20 July 1971 (1971-07-20) ---	
A	US 1 737 514 A (M.NIKOLISH) 26 November 1929 (1929-11-26) ---	
A	US 3 341 843 A (WALSH) 12 September 1967 (1967-09-12) ---	
A	US 3 672 174 A (HIPPEL HANSJEACKIM VEN) 27 June 1972 (1972-06-27) ---	
A	US 2 692 924 A (WILLIAMS) 26 October 1954 (1954-10-26) -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/08844

Patent document cited in search report	Publication date	Patent family member(s)			Publication date
US 4426642	A 17-01-1984	NONE			
US 4913499	A 03-04-1990	GB 2213858 A	23-08-1989	AU 2575088 A	29-06-1989
US 5668325	A 16-09-1997	NONE			
US 4156236	A 22-05-1979	CA 1089051 A	04-11-1980	DE 2904778 A	09-08-1979
		GB 2014314 A, B	22-08-1979		
FR 716766	A 24-12-1931	NONE			
US 3594773	A 20-07-1971	NONE			
US 1737514	A 26-11-1929	NONE			
US 3341843	A 12-09-1967	NONE			
US 3672174	A 27-06-1972	DE 1960807 A	09-06-1971		
US 2692924	A 26-10-1954	NONE			

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:
 Assistant Commissioner for Patents
 United States Patent and Trademark
 Office
 Box PCT
 Washington, D.C.20231
 ÉTATS-UNIS D'AMÉRIQUE

Date of mailing (day/month/year) 07 January 2000 (07.01.00)	in its capacity as elected Office
--	-----------------------------------

International application No. PCT/US99/08844	Applicant's or agent's file reference 65797
International filing date (day/month/year) 22 April 1999 (22.04.99)	Priority date (day/month/year) 30 April 1998 (30.04.98)

Applicant HOWIE, Wayne, L. et al

1. The designated Office is hereby notified of its election made:

in the demand filed with the International Preliminary Examining Authority on:

23 November 1999 (23.11.99)

in a notice effecting later election filed with the International Bureau on:

2. The election was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, ch min des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Olivia RANAIVOJAONA
Facsimile N.: (41-22) 740.14.35	Telephone N.: (41-22) 338.83.38

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 6 E21F17/18 E21D15/46

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 6 E21F E21D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 426 642 A (POFFENBARGER PERRY S) 17 January 1984 (1984-01-17) abstract; figures ---	1,12,15, 21
A	US 4 913 499 A (SMART BRIAN G D) 3 April 1990 (1990-04-03) abstract; figures ---	1,12,15, 21
A	US 5 668 325 A (CHEN JINSHENG S ET AL) 16 September 1997 (1997-09-16) the whole document ---	1,12,15, 21
A	US 4 156 236 A (CONKLE ELLSWORTH V) 22 May 1979 (1979-05-22) ---	1,9,14, 18
A	FR 716 766 A (E. WEXLER) 24 December 1931 (1931-12-24) ---	
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

6 July 1999

Date of mailing of the international search report

13/07/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Fonseca Fernandez, H

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 594 773 A (CONKLE ELLSWORTH V ET AL) 20 July 1971 (1971-07-20) ---	
A	US 1 737 514 A (M. NIKOLISH) 26 November 1929 (1929-11-26) ---	
A	US 3 341 843 A (WALSH) 12 September 1967 (1967-09-12) ---	
A	US 3 672 174 A (HIPPEL HANSJEACKIM VEN) 27 June 1972 (1972-06-27) ---	
A	US 2 692 924 A (WILLIAMS) 26 October 1954 (1954-10-26) -----	

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US 4426642	A 17-01-1984	NONE		
US 4913499	A 03-04-1990	GB 2213858 A	23-08-1989	
		AU 2575088 A	29-06-1989	
US 5668325	A 16-09-1997	NONE		
US 4156236	A 22-05-1979	CA 1089051 A	04-11-1980	
		DE 2904778 A	09-08-1979	
		GB 2014314 A,B	22-08-1979	
FR 716766	A 24-12-1931	NONE		
US 3594773	A 20-07-1971	NONE		
US 1737514	A 26-11-1929	NONE		
US 3341843	A 12-09-1967	NONE		
US 3672174	A 27-06-1972	DE 1960807 A	09-06-1971	
US 2692924	A 26-10-1954	NONE		